

## PhD Position

### Microbe-host associations as drivers of Benthic C and N Cycling in a changing Mediterranean Sea (eMBraCE)

We are looking for a talented and enthusiastic marine ecologist with a background in biogeochemistry or aquatic microbial ecology, for a PhD position focusing on the project “Microbe-host associations as drivers of Benthic C and N Cycling in a changing Mediterranean Sea” (eMBraCE). The project is a collaborative partnership between the University of Bremen and the Stazione Zoologica Anton Dohrn (SZN), Italy.

#### **Project description:**

A long-standing, yet unresolved challenge is to understand and predict how benthic communities contribute to ecosystem functioning and how climate change will affect the cycling of energy and matter in benthic systems. Biogeochemical cycling is driven primarily by the microbial component. At the benthos, virtually all eukaryotes interact with microbes forming microbe-host associations that range from loose and diverse to intimate and selective symbioses. However, the vast majority of research conducted so far focused on the role of species diversity, and we still have an extremely limited understanding of the activity and biogeochemical cycling driven by species interactions, and particularly by microbe-host associations. Since our understanding of the role of microbe-host associations in driving biogeochemical cycling in coastal ecosystems is limited at best, so is our ability to predict the consequences that climate change will have on the functioning of these ecosystems.

One serious impact of anthropogenic carbon dioxide (CO<sub>2</sub>) emissions is ocean acidification (OA). Increasing ocean acidity is already starting to impact biodiversity and food webs in the marine environment. This will ultimately affect ecosystem functioning. However, very little is known on the effects of OA on biogeochemical cycling driven by benthic microbe-host associations.

Therefore, this PhD project will aim to answer the overarching question of whether microbe-host associations act as drivers of biogeochemical cycling in benthic coastal ecosystems, and whether and how OA will affect fluxes of C and nitrogen (N) at the organism and at the ecosystem scale. Within this project, the PhD student will have the opportunity to characterize benthic communities of key Mediterranean habitats (coastal sediments, *P. oceanica* meadows and coralligenous outcrops), identify the most conspicuous microbe-host associations, and quantify their role in biogeochemical cycling of C and N within their habitats in control vs naturally acidified sites at the CO<sub>2</sub> vents off Ischia island, using both classical physiological methods and state-of-the-art stable isotope and molecular (DNA-based) approaches. Statistical analyses and budgeting methods will allow quantifying the contribution of each association to the biogeochemical cycling at the organism and ecosystem level.

The project is relevant and urgently needed, because: i) it will improve our understanding of the role of microbe-host associations in biogeochemical cycling and ecosystem functioning, and ii) it will help constraining the fluxes of energy and matter cycling through the Mediterranean benthos in a time of ever increasing human pressure on the planet.

#### **Conditions of employment:**

The position is funded for a three-year period and depends on final approval by collaboration partners. Envisioned start is November 2018. You will be appointed as a PhD candidate in the German university system and your salary will be according to the German TV-L 13 for a 50 % position. The University of Bremen is an equal opportunity employer and as such encourages applications from women and minorities.

**Requirements:**

You should hold a Master degree in marine biology, biogeochemistry, microbial ecology, or related fields. In addition, you should have a good command of spoken and written English, have a passion for science, a demonstrated ability to conduct and report about research, and a strong motivation to work in the fields of coastal biogeochemistry and microbial ecology. Expertise in physiological, biogeochemical, and/or molecular & modelling tools along with technical expertise of experimental work in aquarium facilities and/or at sea are assets. A scuba diving certificate – in the best case European research diver qualification - is an additional asset.

**Mentoring plan:**

To develop this project, the student will be working under the supervision of Prof. Dr. Christian Wild (University of Bremen) and Dr. Ulisse Cardini (SZN). Additional training and supervision will be provided by Dr. Grazia Quero (SZN) for molecular analyses. A collaboration with Prof. Marco Bartoli (University of Parma, Italy) is also envisioned in the frame of the PhD project. The student will thus have the opportunity since the very beginning to work in a dynamic, international and multidisciplinary research team, benefitting from the use of advanced laboratories facilities and enhanced training and networking opportunities.

**Application:**

To apply, please send a motivation letter and a complete CV with list of publications and skills along with names of two referees (with email addresses and phone numbers) in a single pdf-file to Prof. Christian Wild and Dr. Ulisse Cardini (see emails below). Only short-listed candidates will be notified.

Should you require any further information prior to submitting your application, you can contact:

**Prof. Dr. Christian Wild**

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**Closing Date:**

July 29, 2018 or until a qualified candidate is identified.